(q) Explain principle of differential pulse polarography. 5

(r) Calculate diffusion current for an experiment if concentration of electroactive species is 3mM, capillary characteristics are 1.35 and diffusion current constant is 1·56. 5

5. (a) Write Randles's Sercik equation for reversible process. How can it be used to determine reversibility of electrode process ? 6

(b) Give principle and technique of anodic stripping voltammetry. 5

(c) Explain amperometric titration of Pb^{2+} with So_4^{2-} 5

OR

(p) Explain application of cyclic voltammetry in adsorption studies. 6

(q) Discuss principle of chronopotentiometry. 5

(r) What is organic polarography ? Name various reducible groups in organic compounds. 5

AQ – 998

Third Semester M. Sc. (Part – II) (CBCS)
Chemistry Examination

ANALYTICAL CHEMISTRY – I

Paper – X

(Thermal and Electroanalytical Methods)

P. Pages : 4

Time : Three Hours] [Max. Marks : 80

Note : (1) All questions are compulsory and carry equal marks.
(2) The use of log tables/calculator is permitted.

1. (a) Explain the principle and instrumentation of TGA. 6

(b) What is DTA ? What are its applications ? 5

(c) Give comparison of DTA and DSC. 5

OR

(p) Describe the TGA in case of thermal decomposition of $CuSO_4 \cdot 5H_2O$ and $CaC_2O_4 \cdot H_2O$. 6

(q) Write explanatory note on thermometric titrations. 5

(r) Explain factors affecting DTA curves. 5

2. (a) What are conductometric titrations ? Explain conductometric titration of mixture of acetic acid and oxalic acid with std. NaOH solution. 6

(b) Give advantages of coulometric titrations over visual titrations. 5

(c) Explain the role of electrogravimetry in separation and estimation of metal ions. 5

OR

(p) What are high frequency titrations ? How can they be carried out without dipping electrodes in the solution ? 6

(q) Calculate the amount of copper in a solution that requires a current of 1 Ampere for 120 min. for complete electrolysis. (Given at.wt of Cu = 63.5). 5

(r) Define overpotential. What are the factors affecting it ? 5

3. (a) Write Nernst equation. How is it applied to determine number of electrons involved in cell reaction ? 6

(b) The EMF of following cell is 0.1182 V. Calculate pH of the solution.

$Pt/Q, H_2$ Q, $H^+ \| KCl$ (sat), $Hg_2 Cl_2/Hg$

Given : $E^0_Q = 0.6994$ V

$E^0_{SCE} = 0.2422$ V. 5

(c) Give advantages and applications of ISE. 5

OR

(p) What are electrochemical sensors ? How enzyme electrodes can be used as sensors ? 6

(q) Explain construction, working and applicability of glass electrode. 5

(r) Explain estimation of Cl^- and I^- in a mixture using potentiometric titrations. 5

4. (a) Explain various types of currents in polarography. 6

(b) With suitable diagram, explain experimental set up of polarographic experiment. 5

(c) What are reversible and irreversible processes in polarography ? 5

OR

(p) Write short notes on :—

(i) Polarographic Maxima.

(ii) Half wave potential. 6